UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/764,050 | 01/19/2001 | Tadashi Okamoto | 35.C15261 | 6689 |

5514 7590 08/28/2002

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

| EXAMINER |
|---|
| TUNG, JOYCE |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1637 | 12 |

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/764,050 | OKAMOTO ET AL. | |
| | Examiner | Art Unit | |
| | Joyce Tung | 1637 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *14 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Detailed Action* .

## DETAILED ACTION

The Group and/or Art Unit location of your application in the PTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Group Art Unit 1637.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claims 1-19 are vague and indefinite because of the language "realizing a state". It is unclear what is meant by the language in the method step. Additionally, the language "in the dried state" which has no antecedent basis. The language "derived from" is used to describe a chemical compound which is chemically modified. Does it mean that the targeted nucleotide chain is chemically modified? Clarification is required.

b. Claims 4-5 and 20-26 vague and indefinite because of the language "the same" in claims 4-5 and claim 20, and the language "in the dried state" and 'the obtained measured values" in claim 20 which have no antecedent basis.

c. Claims 20-26 are vague and indefinite because it is unclear what is meant by the language "a clean observation substrate". Clarification is required.

d. Claims 20-26 are vague and indefinite because of the language "even in the dried state. It is unclear whether or not there is an alternative that the detection can be done in a solution. Clarification is required.

3. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-7, 9, 11-14, 18, 20-21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. (WO 87/06956), in view of Johann et al. (6,277,628) and Kang et al. (6,268,131).

Sutherland et al. disclose a waveguide coated with single-stranded probe nucleic acid in which the single-stranded sample nucleic acid is allowed to react with the probe in the presence of intercalant fluorescence dyes (See pg. 5, fifth paragraph). An analyte solution contains test DNA or RNA (See the Abstract). A double stranded DNA is used with ethidium bromide (See pg. 36, third paragraph). The waveguide substance is a plastic cuvette (See pg. 40, claim 14).

Sutherland et al. do not disclose drying the hybrid and the fluorescence dye on the substrate.

Johann et al. disclose a method and a composition for detecting the levels of a plurality of biomolecular probes in a sample. In particular the invention relates to a hybridization composition for detecting the presence or the levels of different polynucleotide sequences in a sample (See the Abstract). The biomolecular probe comprises polynucleotide probes and the target are complementary polynucleotide sequences (See column 1, lines 55-57) in which target is immobilized (See column 1, lines 45-48). The target can be DNA or RNA (See column 5, lines 20-36). The labels can be fluorescent markers and dyes (See column 5, lines 37-48). The labeling moiety can be incorporated after hybridization once a probe-target complex is formed (See column 5, lines 49-53). The Cy5-5' labeled 59mer was used to fill a glass bead capillary

array, washed and then dried. The array was detected by a confocal fluorescence microscope (See column 8, lines 22-32).

One of ordinary skill in the art at the time of the instant invention would have been motivated to apply the drying step of Johann et al. (See column 8, lines 22-32) to the method of Sutherland et al. because as indicated by Kang et al. (6,268,131) that upon drying the matrix-DNA complex it forms a uniform crystalline surface (See column 35, lines 34-39), the method of Johann et al. is high throughput hybridization experiments utilizing small sample (See column 2, lines 32-35). Thus, it would have been prima facie obvious to carry out the method as claimed.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. (WO 87/06956), in view of Johann et al. (6,277,628) and Kang et al. (6,268,131) as applied to claims 1-7, 9, 11-14, 18, 20-21 and 25 above, and further in view of Miyakoshi et al. (JP404330300).

The teachings of Sutherland et al., Johann et al. and Kang et al. are set forth in section 5 above and none of the references discloses using resin as solid- phase substrate as claimed in claim 10.

Miyakoshi et al. disclose that a resin membrane is used to efficiently immobilize a short-chain nucleic acid, thus simplifies operation of hybridization (See the Abstract).

Thus, one of ordinary kill in the art at the time of the instant invention would have been motivated to apply resin membrane as solid phase substrate as claimed with a reasonable expectations of success because a resin membrane was used to efficiently immobilize a short-

chain nucleic acid, thus simplifies operation of hybridization (See the Abstract). It would have been prima facies obvious to carry out the method as claimed.

7. Claims 15, 17, 19, 22-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. (WO 87/06956), in view of Johann et al. (6,277,628) and Kang et al. (6,268,131) as applied to claims 1-7, 9, 11-14, 18, 20-21 and 25 above, and further in view of Yamamoto et al. (Nucleic Acid Research, 1995, Vol. 23(8), pg. 1445-1446).

The teachings of Sutherland et al., Johann et al. and Kang et al. are set forth in section 5 above and none of the references discloses using pyrylium salt and YOYO-1 as intercalator as claimed in claims 15,17, 19, 22-24 and 26.

Yamamoto et al. disclose a new method of detecting the nucleic acid amplified products using a fluorescent intercalator pyrylium salt (P2) which shows strong fluorescence when reacted with double stranded DNA(dsDNA) in proportion to the amount of dsDNA (See pg. 1445, third paragraph). YOYO-1 has also a large increase of fluorescence intensity when it is intercalated into dsDNA (See pg. 1446, second paragraph).

Thus, one of ordinary kill in the art at the time of the instant invention would have been motivated to apply the fluorescence intercalator of Yamamoto et al. to the method of Sutherland et al. with a reasonable expectation of success because of the benefit of using the fluorescent intercalator pyrylium salt (P2) and YOYO-1 as discussed above. It would have been prima facie to carry out the method as claimed.

8. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Joyce Tung whose telephone number is (703) 305-7112. The examiner can normally be reached on Monday-Friday from 8:00 AM-4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached at (703) 308-1119 on Monday-Friday from 10:00 AM-6:00 PM.

Any inquiries of a general nature or relating to the status of this application should be directed to the Chemical/Matrix receptionist whose telephone number is (703) 308-0196.

9. Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Art Unit 1637 via the PTO Fax Center located in Crystal Mall 1 using (703) 305-3014 or 308-4242. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989).

Joyce Tung

August 22, 2002

KENNETH R. HORLICK, PH.D
PRIMARY EXAMINER
8/22/02